

**What is claimed is:**

1. A size for producing a mold release layer with long-term stability, comprising

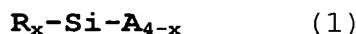
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A) an inorganic binder which comprises colloidal inorganic particles based on silicon oxide, zirconium oxide or aluminum oxide or boehmite or mixtures thereof, additional inorganic fillers selected from the group comprising  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{AlOOH}$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{CeO}_2$ ,  $\text{SnO}_2$ , iron oxides and carbon, and also optionally further additives, where

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15 i) in the case of a binder comprising colloidal inorganic particles based on silicon oxide, the binder further comprises one or more silanes of the general formula (1):

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in which

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A are each independently hydrolytically eliminable groups selected from the group comprising hydrogen, halogens, hydroxyl groups and substituted or unsubstituted alkoxy groups having from 2 to 20 carbon atoms, aryloxy groups having from 6 to 22 carbon atoms, alkylaryloxy, acyloxy and alkylcarbonyl groups,

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R are each independently hydrolytically non-eliminable groups selected from the group comprising alkyl groups having from 1 to 20 carbon atoms,

5 alkenyl groups having from 2 to 20 carbon atoms, alkynyl groups having from 2 to 20 carbon atoms, aryl groups having from 6 to 22 carbon atoms, alkaryl and arylalkyl groups,

10 x is 0, 1, 2, 3, with the proviso that x ≥ 1 for at least 50% of the amount of silanes,

15 and

15 substoichiometric amounts of water based on the hydrolyzable groups of the silane component and

optionally an organic solvent

20 or

25 ii) in the case of a binder free of colloidal inorganic particles based on silicon oxide, the binder further comprises water as a solvent

25 and, under the conditions of the sol-gel process, if appropriate with hydrolysis and condensation, forms a nanocomposite sol,

30 B) a suspension of boron nitride particles in the organic solvent in the case that the binder (i) is used, or in water in the case that the binder (ii) is used,

35 and

C) an organic solvent in the case that the binder (i) is used, or water in the case that the

binder (ii) is used.

2. The size as claimed in claim 1, characterized in that polyvinyl butyral or a polyacrylic acid is added to the suspension of boron nitride particles in the case that the binder (i) is used, or a polyvinyl alcohol or polyvinylpyrrolidone is added to the suspension in the case that the binder (ii) is used.
- 10 3. The size as claimed in claim 1 or 2, characterized in that it has a pH of from 3 to 4.
- 15 4. The size as claimed in at least one of claims 1 to 3, characterized in that the boron nitride has a particle diameter less than 10  $\mu\text{m}$  and greater than 1  $\mu\text{m}$ .
- 20 5. The size as claimed in at least one of claims 1 to 4, characterized in that the boron nitride has a hexagonal, graphite-like crystal structure.
- 25 6. The size as claimed in at least one of claims 1 to 5, characterized in that the boron nitride has a specific surface area measured by the BET method of from 1 to 100  $\text{m}^2/\text{g}$ .
- 30 7. The size as claimed in at least one of claims 1 to 6, characterized in that the boron nitride has a purity of at least 98%.
- 35 8. The size as claimed in at least one of claims 1 to 7, characterized in that the boron nitride is present in the size in deagglomerated form.
9. The size as claimed in at least one of claims 1 to 8, characterized in that the additional inorganic fillers are nanoparticles which

5 preferably have a particle diameter of less than 300 nm, preferably less than 100 nm and more preferably less than 50 nm, and are of silicon oxides or zirconium oxides or boehmite or mixtures thereof.

10 10. The size as claimed in at least one of claims 1 to 9, characterized in that the silanes used are methyltriethoxysilane, tetraethoxysilane or phenyltriethoxysilane or mixtures thereof.

15 11. The size as claimed in at least one of claims 1 to 10, characterized in that the amount of water used for hydrolysis and condensation is from 0.1 to 0.9 mol of water per mole of hydrolyzable groups present.

20 12. The size as claimed in at least one of claims 1 to 9, characterized in that the starting compounds used for the zirconium components for the colloidal inorganic particles are one or more zirconium oxide precursors of the substance classes of zirconium alkoxides, zirconium salts or complexed zirconium compounds or colloidal  $ZrO_2$  particles which may be unstabilized or stabilized.

25 13. The size as claimed in at least one of claims 1 to 9 or 12, characterized in that the starting compounds used for the aluminum components for the colloidal inorganic particles are aluminum salts, aluminum alkoxides, nanoscale  $Al_2O_3$  or  $AlOOH$  particles in the form of sols or powders.

30 14. A process for producing a size as claimed in at least one of claims 1 to 13, characterized in that boron nitride is dispersed in the solvent in a dispersion apparatus and mixed with the inorganic binder.

15. The process as claimed in claim 14, characterized in that polyvinyl butyral or a polyacrylic acid is added to the inorganic binder in the case that the binder (i) is used, or a polyvinyl alcohol or polyvinylpyrrolidone is added to the inorganic binder in the case that the binder (ii) is used.
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16. The process as claimed in claim 14 or 15, characterized in that the dispersion apparatus used is an Ultra-Turrax or high-performance centrifugal homogenizer.
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17. The process as claimed in at least one of claims 14 to 16, characterized in that the size has a pH of from 3 to 4.
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18. A mold release layer with long-term stability, obtainable from a size as claimed in at least one of claims 1 to 13, characterized in that the layer thickness of the cured mold release layer has from 0.5 to 250  $\mu\text{m}$ .
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19. The mold release layer as claimed in claim 18, characterized in that the temperature for thermally attaching or compacting the mold release layer is less than 600°C.
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20. The mold release layer as claimed in claim 18, characterized in that the mold release layer is obtained in situ by virtue of the metal melt.
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21. The mold release layer as claimed in at least one of claims 18 to 20, characterized in that the BN content of the cured mold release layer is from 20 to 80% by weight.
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22. A process for producing a mold release layer with

long-term stability as claimed in at least one of claims 18 to 21, characterized in that the size as claimed in at least one of claims 1 to 11 is applied to a firmly adhering layer on metal or  
5 inorganic nonmetal surfaces.

23. The process as claimed in claim 22, characterized in that the metal or inorganic nonmetal surfaces are iron, chromium, copper, nickel, aluminum, 10 titanium, tin and zinc and alloys thereof, cast iron, cast steel, steels, bronzes, brass, ceramics, refractory materials and glasses in the form of films, fabrics, sheets, plaques or moldings.  
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24. The process as claimed in claim 22 or 23, characterized in that the size is applied to the metal or inorganic nonmetal surfaces by knife-coating, dipping, flow-coating, spin-coating, 20 spraying, brushing and spreading.

25. A process for producing a suspension containing boron nitride particles, characterized in that boron nitride particles are suspended in an organic solvent with the addition of polyvinyl butyral or of a polyacrylic acid or in water with the addition of a polyvinyl alcohol or polyvinylpyrrolidone.  
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